## Fish in the Lake Sample Data

| Sample number | Number of tagged fish | Total number of fish | Ratio of tagged fish to total fish |
|---|---|---|---|
| 1 | 3 | 60 | $\frac{3}{60}$, or $\frac{1}{20}$ |
| 2 | 6 | 67 | $\frac{6}{67}$ |
| 3 | 3 | 73 | $\frac{3}{73}$ |
| 4 | 4 | 66 | $\frac{4}{66}$, or $\frac{2}{33}$ |
| 5 | 4 | 88 | $\frac{4}{88}$, or $\frac{1}{22}$ |
| 6 | 2 | 72 | $\frac{2}{72}$, or $\frac{1}{36}$ |

## Ship Canals

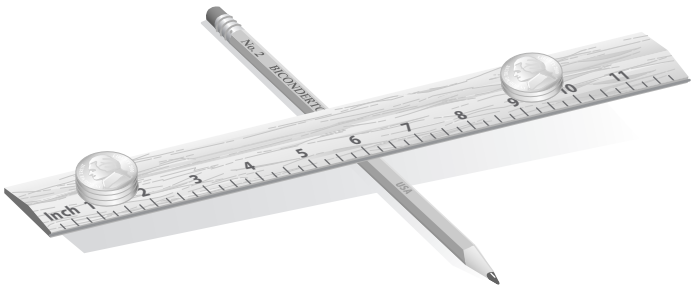
| Canal | Length (miles) | Length (kilometers) |
|---|---|---|
| Albert (Belgium) | 80 | 129 |
| Alphonse XIII (Spain) | 53 | 85 |
| Houston (Texas) | 50 | 81 |
| Kiel (Germany) | 62 | 99 |
| Main-Danube (Germany) | 106 | 171 |
| Moscow-Volga (Russia) | 80 | 129 |
| Panama (Panama) | 51 | 82 |
| St. Lawrence Seaway (Canada/United States) | 189 | 304 |
| Suez (Egypt) | 101 | |
| Trollhätte (Sweden) | | 87 |

(*The Top 10 of Everything 1998*, p. 57)

# Seesaw Nickels

**Name** _____ **Period** _____ **Date** _____

If a grown man and a small child sit on opposite ends of a seesaw, what happens? Would changing or moving the weight on one end of the seesaw affect the balance? You'll find out as you do the experiment in this investigation. You will need a pencil, a 12-inch ruler, nine nickels, and tape.




Step 1 On a flat desk or table, try to balance the ruler across a pencil near the ruler's 6-inch mark.

Step 2 Stack two nickels on the ruler so that they're centered 3 inches to the right of the pencil. You may need to tape them in place.

Step 3 Place one nickel on the left side of the ruler so that it balances the two right-side nickels. Be sure that the ruler stays centered over the pencil. How far from the pencil is this one nickel centered?

Step 4 Repeat Step 3 for two, three, four, and six nickels on the left side of the ruler. Measure to the nearest $\frac{1}{2}$ inch. Copy and complete this table.

| Left side | | Right side | |
|---|---|---|---|
| **Number of nickels** | **Distance from pencil** | **Number of nickels** | **Distance from pencil** |
| 1 | | 2 | 3 |
| 2 | | 2 | 3 |
| 3 | | 2 | 3 |
| 4 | | 2 | 3 |
| 6 | | 2 | 3 |

Step 5 As you increase the number of nickels on the left side, how does the distance from the balance point change? What relationships do you notice?

Step 6 Make a new table and repeat the investigation with three nickels stacked 3 inches to the right of center. Does the same relationship seem to hold true?

Step 7 Review the data in your tables. How does the number of nickels on the left and their distance from the pencil compare to the number of nickels on the right and their distance from the pencil? In each of your tables, do quantities remain constant? Write a sentence using the words *left nickels, right nickels, left distance,* and *right distance* to explain the relationship between the quantities in this investigation. Define variables and rewrite your sentence as an equation.

Step 8 Explain why you think this relationship between the number of nickels on the left side and the distance from the pencil is an *inverse* relationship.

# Direct Variation

An equation of the form $y = kx$ is a **direct variation.** The quantities represented by $x$ and $y$ are **directly proportional,** and $k$ is the **constant of variation.**

# Inverse Variation

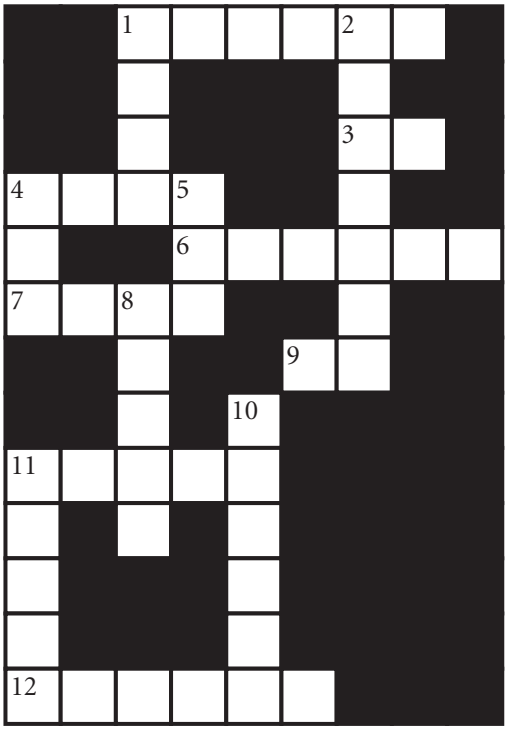
An equation of the form $y = \frac{k}{x}$ is an **inverse variation.** Quantities represented by $x$ and $y$ are **inversely proportional,** and $k$ is the **constant of variation.**

## Order of Operations

1. Evaluate expressions within parentheses or other grouping symbols.
2. Evaluate all powers.
3. Multiply and divide from left to right.
4. Add and subtract from left to right.

# Cross-Number Puzzle

**Name** _____ **Period** _____ **Date** _____



## Across

**1.** $\frac{2}{3}$ of 159,327

**3.** $\frac{-1 + 17^2}{4 + 2^2}$

**4.** $4835 - 541 + 1284$

**6.** $\frac{3 + 140}{3 \cdot 14}$ (fraction form)

**7.** $8075 - 3(42)$

**9.** $\sqrt{6^2 + 8^2}$

**11.** $\frac{740}{18.4 - 2.1 \cdot 9}$

**12.** $57^3$

## Down

**1.** $9(-7 + 180)$

**2.** $\left(\frac{9}{2}\right)\left(\frac{17}{5} + \frac{25}{4}\right)$ (fraction form)

**4.** $3 - 3(12 - 200)$

**5.** $9 \cdot 10^2 - 9^2$

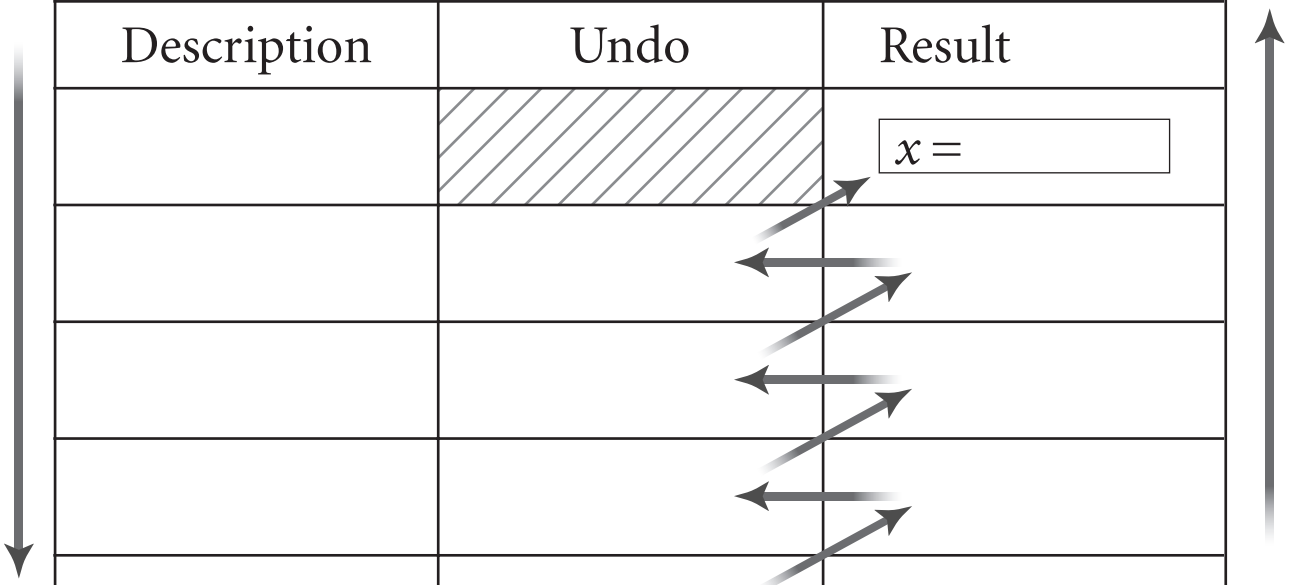
**8.** $15 + 47(922)$

**10.** $25.9058 \cdot 20/4 - 89$ (decimal form)

**11.** $1284 - \frac{877}{0.2}$

## Undoing Operations

| Equation: | = | |
|---|---|---|
| Description | Undo | Result |
| | | $x =$ |
| | | |
| | | |
| | | |
| | | |



| Equation: | = | |
|---|---|---|
| Description | Undo | Result |
| | | $x =$ |
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